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Listing of the Claims

Claims 1-53 (Cancelled)

54. (Currently Amended)[The] <u>A</u> method [of claim 36] <u>of utilizing a microband electrode array sensor comprising a substrate having a first edge;</u>

<u>a layer of insulating material on top of said substrate, said layer of insulating material having a first edge;</u>

<u>said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;</u>

C3

<u>a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers and;</u>

<u>a plurality of gaps, one gap between each of two adjacent microband electrodes and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs ;said method comprising the steps of:</u>

<u>(a) contacting said sensor with a sample suspected of containing an analyte; and</u>

<u>(b) performing anodic stripping voltammetry</u>

wherein said microband electrode array sensor wherein said insulating material is chosen from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.

Claims 55-68 (Cancelled)

69. (New) A method of utilizing a microband electrode array sensor comprising:

a substrate having a first edge;

a layer of insulating material having a first edge aligned with said first edge of said substrate; and

a plurality of microband electrodes between said substrate and said layer of insulating material;

C3 Cont'd

said microband electrodes having a surface exposed at said first edges of said substrate and said insulating layer, said insulating material forming a plurality of gaps, wherein there is one gap between each of two adjacent microband electrodes, wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers; and wherein the size of each gap is selected such that in operation, the signals produced by said microband electrodes in said array are additive; which method comprises the steps of:

(a) contacting said sensor with a sample suspected of containing an analyte; and

(b) applying a voltage to the electrodes of said sensor and scanning the voltage over a range such that said analyte should be oxidized or reduced at said microband electrode.

70. (New) The method of claim 69 wherein the voltage is scanned from a negative voltage to a positive voltage.

71. (New) The method of claim 69 wherein said insulating material of said sensor is selected from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.

72. (New) The method of claim 69 wherein the exposed surface of each of said microband

electrodes has a thickness of between about 0.03 and 5 micrometers.

73. (New) The method of claim 69 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0.1 to about 0.2 micrometers.

74. (New) The method of claim 69 wherein the exposed surface of each of said microband electrodes has a width between 1 to 25 micrometers.

75. (New) The method of claim 69 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.

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76. (New) The method of claim 75 wherein said adhesion layer comprises chromium.

77. (New) The method of claim 69 wherein said substrate is planar.

78. (New) The method of claim 69 wherein said sensor is integrated into a channel.

79. (New) The method of claim 69 wherein the sample is contacted with a plurality of layers of microband electrode array sensors separated from each other by insulating material.

80. (New) The method of claim 79 wherein in the multi-layer microband electrode sensors each of said substrates is planar.

81. (New) A method for performing electrochemical measurements on a sample comprising the step of contacting a sample suspected of containing an analyte with a microband electrode array sensor comprising:

a substrate having a first edge;

a layer of insulating material having a first edge aligned with said first edge of said substrate; and

a plurality of microband electrodes between said substrate and said layer of insulating material;

said microband electrodes having a surface exposed at said first edges of said substrate and said insulating layer, said insulating material forming a plurality of gaps, wherein there is one gap between each of two adjacent microband electrodes, wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers; and wherein the size of each gap is selected such that in operation, the signals produced by said microband electrodes in said array are additive; and

C3 Cont'd

wherein the sensor is integrated into a channel

82. (New) The method of claim 81 wherein the electrochemical measurement conducted with said sensor is selected from the group consisting of electrogravimetry; controlled-potential coulometry; controlled-current coulometry; voltammetry; anodic- and cathodic-stripping voltammetry; cyclic voltammetry; square wave voltammetry; differential pulse voltammetry; adsorptive stripping voltammetry; potentiometric stripping analysis and amperometry.

83. (New) The method of claim 81 wherein the electrochemical measurement conducted with said sensor is cyclic voltammetry.

84. (New) The method of claim 81 wherein the electrochemical measurement conducted with said sensor is cyclic voltammetry.

85. (New) The method of claim 81 wherein said insulating material is selected from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.

86. (New) The method of claim 81 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0 .03 and 5 micrometers.

87. (New) The method of claim 81 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0.1 to about 0.2 micrometers.

88. The method of claim 81 wherein the exposed surface of each of said microband electrodes has a width of between 1 and 25 micrometers.

89. (New) The method of claim 81 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.

C3 Cont'd

90. (New) The method of claim 89 wherein said adhesion layer comprises chromium.

91. (New) A microband electrode array sensor for detecting the presence or measuring the concentration of analytes in a sample, said sensor comprising:

a substrate having a first edge;

a layer of insulating material having a first edge aligned with said first edge of said substrate; and

a plurality of microband electrodes between said substrate and said layer of insulating material;

said microband electrodes having a surface exposed at said first edges of said substrate and said insulating layer, said insulating material forming a plurality of gaps, wherein there is one gap between each of two adjacent microband electrodes, wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers; and wherein the size of each gap is

selected such that in operation, the signals produced by said microband electrodes in said array are additive.

92. (New) The microband electrode array sensor of claim 91 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0.03 to about 5 micrometers.

C 3 Cont'd

93. (New) The microband electrode array sensor of claim 91 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0.1 to about 0.2 micrometers.

94. (New) The microband electrode array sensor of claim 91 wherein the exposed surface of each of said microband electrodes has a width between 1 and 25 micrometers.

95. (New) The microband electrode array sensor of claim 91 wherein said insulating material is selected from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.